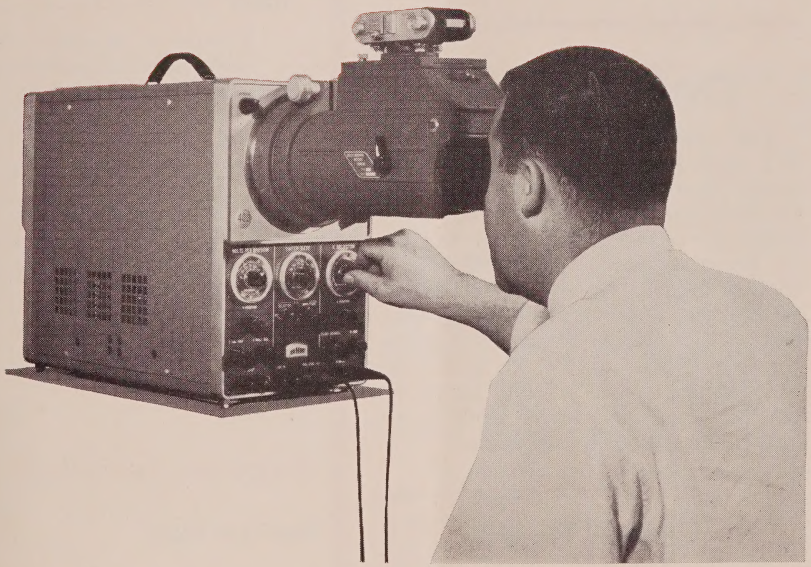
ISSUE 2

DU MONT Instrument Journal



DU MONT TECHNICAL PRODUCTS DIVISION

DU MONT
Instrument
Journal

A PUBLICATION DEVOTED TO ELECTRONIC INSTRUMENTATION AND RELATED FIELDS, PROVIDING THE LATEST INFORMATION ON DEVELOPMENTS IN EQUIPMENT, APPLICATIONS AND TECHNIQUES. PERMISSION FOR REPRINTING ANY MATERIAL CONTAINED HEREIN MAY BE OBTAINED BY WRITING TO THE EDITOR AT THE ADDRESS BELOW.

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CONSULTING EDITOR -
NEIL UPTEGROVE

On The Cover

Our front cover shows the Type 352 record-camera in use, recording traces from a Du Mont Type 403 Oscilloscope. With more and more emphasis in the industry for the use of photo-recording equipment, our feature articles on obtaining best results from Kodak Tri-X film, courtesy of the Kodak Research Laboratories of Rochester, N. Y., and a development article on Du Mont recording cameras, have been given special attention in this issue.

Next Issue

The feature article of Issue 3 will be a report on the Flying-spot Scanning System for industrial, medical, and general laboratory uses. The scanning system is a result of an extensive research program at Du Mont. Concrete findings will be discussed.

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DEVELOPING HIGH-SPEED FILM USED IN RECORDING OSCILLOSCOPE TRACES

By: Allan L. Sorem
Kodak Research Laboratories

High-speed phenomena, such as many transients, can produce such fast, short-time oscilloscope traces that little light output results. Problems in permanently recording such traces photographically are acute, and require a fast film for any perceptible record. Developing the film to gain the greatest contrast has also been a problem, and required research to determine the best techniques. The details and results of such a research program are discussed here.

EDITOR'S NOTE: Kodak Tri-X film is recommended for use in photographing oscilloscope traces with Du Mont's Oscilloscope-Recording Cameras — the Types 296, 298, 299, 321-A and 352. Kodak Tri-X film is probably the fastest film commercially available for such use; thus the recommendation. We asked the Kodak Company if they would supply us with some information on "what is the best way to develop this film to obtain the best overall results". In order to answer us best, they did some research. Then, they graciously gave us the following information in letter form so that we could pass it along to our readers. Our thanks to everyone concerned in Kodak's Research Laboratories, in Rochester, New York.

The studies of the use of Kodak Tri-X Film in photographing cathode-ray tube oscilloscope traces which were necessary in order to furnish the information requested have been completed.

Many Techniques Investigated

The tests consisted of exposing samples of Kodak Tri-X Film to the image of a trace representing a damped oscillation on a 5-inch cathode-ray tube coated with P-11 phosphor. The oscilloscope provided an accelerating potential of 12 kilovolts, and the maximum writing rate produced by the input signal was 60 centimeters per microsecond. A number of techniques were tried for hypersensitizing the film before exposure and intensifying the latent image after exposure. In addition, a number of different developers were tried in an attempt to find a combination which would produce significant speed increases. The photographic images were evaluated by direct inspection of the negatives and also by making enlarged prints.

The results of the tests can be briefly summarized by stating that it seems to be almost impossible to improve the speed and image quality of Kodak Tri-X Film beyond that obtained by simply developing it in Kodak Developer D-19 at 68°F for 10 minutes.

Development for 12 minutes in Kodak Developer SD-19a will produce an image of higher contrast, which under some circumstances may

be equivalent to a gain in speed, but this is achieved at the expense of greatly increased granularity.

Speed vs. Granularity

A graph (figure 1) which shows the relation between density of the developed image and the exposure (on a logarithmic scale, see Figure 1) for Kodak Tri-X Film developed in D-19 and SD-19a, as mentioned above. A comparison of the two curves shows that the question of whether one developer or the other produces more speed with Kodak Tri-X Film depends upon the density differences which is desired between the image of the oscilloscope trace and the background. For a threshold or just-perceptible image, the two developers produce about equal speeds. If, however, densities which are much higher than those of a threshold image are desired, then SD-19a unquestionably produces higher speed. In a particular application, it would have to be determined from tests whether the possible advantage of the increased density difference between the image and the background was offset by the attendant increase in granularity when SD-19a is used.

The formula for Kodak Developer D-19 is as follows:

Water, about 125°F	500 cc
Kodak Elon Developing Agent	2.0 grams
Kodak Sodium Sulfite, desiccated	90.0 grams
Kodak Hydroquinone	8.0 grams
Kodak Sodium Carbonate, monohydrated	52.5 grams
Kodak Potassium Bromide	5.0 grams
Cold water to make	1.0 liter

Kodak Developer SD-19a is made by adding 30 cc per liter of Kodak Solution A for SD-19a Developer (hydrazine dihdrochloride) to D-19. The two solutions should be at 68°F

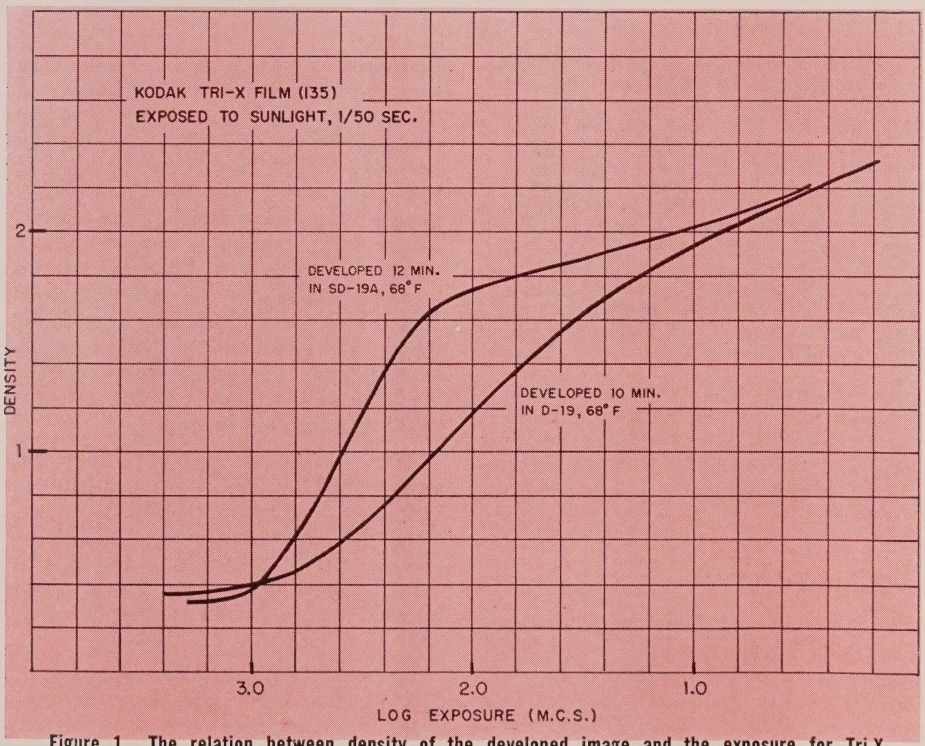


Figure 1. The relation between density of the developed image and the exposure for Tri-X Film developed on D-19 and SD-19-a developers.

before mixing, and, for repeatable results, the developer should be used exactly one-half hour after the addition of the Solution A. It should be discarded after use.

Experiments For Gain In Film Speed

A slight gain in film speed can be obtained under some conditions by exposing the film to light of low intensity following the exposure to the cathode-ray tube image. For Kodak Tri-X Film, this exposure should be equivalent to about 1/500 meter-candlesecond, e.g., 1/500 meter-candle for one second, or 1/1000 meter-candle for two seconds. Because such a postexposure will tend to increase granularity, it is well to experiment until an optimum exposure is found.

The effects of the development of Tri-X Film in Kodak Ektachrome First Developer for 6 minutes at 68° F has been investigated. This does not produce a gain in speed, although reports have reached us that the use of this developer has been advantageous with certain black-and-white materials in other applications.

It should be mentioned parenthetically that attempts to increase the effective speed of a given film, whether by prolonged or extremely active development or by intensification of the latent image, or by any other scheme, almost invariably result in increased granularity over that normally obtained when the film is used under conditions recommended by the manufacturer.

The realization of increased speed without the attendant increase in grain comes about through new discoveries in the technology of emulsion-making, such as those which led to the introduction of Kodak Tri-X Film. Numerous proprietary methods, for which speed increases without granularity increases are claimed have been tested, and none have been found which fully justify these claims.

Phosphor In Cathode-Ray Tube An Important Factor

The successful recording of cathode-ray tube images involves a number of variables in addition to films and developers. As you are undoubtedly aware, the maximum intensity available in the cathode-ray tube trace without serious loss of definition varies considerably from one phosphor to another. The color of the trace is of great importance, both from the standpoint of film speed and also because the light of shorter wave lengths may produce a sharper image on the film. The duration of the image, which at high writing rates is chiefly a function of the persistence of the phosphor, determines the extent to which reciprocity-law failure of the film will effect its apparent sensitivity.

If a choice of phosphors is available, our experience in kinescope recording indicates that there is an advantage in using the P-16 in preference to the P-11. Higher screen image intensities can be obtained with the P-16 phosphor without blooming. The grains of this phosphor are smaller and therefore capable of giving higher resolution. There is less spreading of the image in the film because of the shorter wave length of the peak emission. Finally, it seems that P-16 coatings are more uniform than P-11, so that for marginal intensities and writing rates there is a smaller chance of losing a portion of the trace where the deposit is thinner.

Summary

In summary, it can be said that Kodak Tri-X Film has been found to be highly satisfactory for recording cathode-ray tube traces by conventional methods of photography and development. The recommended development is 10 minutes in D-19 at 68°F for most purposes, or 12 minutes in SD-19a at 63°F when higher contrast is required. A slight gain in speed is achieved by exposure of the film to light of low intensity after exposure to the cathode-ray tube image.

KEEPING IN PHASE

If you, Mr. Reader, have any questions, basic or advanced, concerning oscilloscopes or related fields please send them along to KEEPING IN PHASE, c/o the "Du Mont Instrument Journal" at the address shown on page 2.

Q. What is a hard tube sweep?

A. A hard tube is a vacuum tube that has been evacuated to such a high degree that it approaches a perfect vacuum. The advantages of a hard tube sweep circuit in scopes over that of a soft gaseous tube circuit is that a hard tube makes it easier to synchronize and calibrate; it permits a faster re-trigger time; it is much more stable; and it permits the trace "spot" to initiate from the left side of the screen. This is important, because with the use of soft tubes the spot appears on the right side of the screen and it has to re-trace to the left side to begin the sweep.

Q. What is meant by "sync lockout"?

A. In oscilloscopes, "sync lockout" is when the spot begins its traverse on the cathode-ray tube screen and continues on until it completes the sweep, regardless of the presence of sync signals during the trace, then returns to the original starting point. This repeated performance is known as "sync-lockout".

Q. What is the difference between a mono-accelerating cathode-ray tube and a post-accelerating cathode-ray tube?

A. When a desired amount of voltage is applied to the cathode-ray tube, the electrons are driven from the gun toward the fluorescent screen at a high velocity by the high potential of the pre-accelerating electrodes; this forms an electron beam. In a mono-accelerator tube, all accleration of the beam is accomplished prior to reaching the deflection plates. The post-accelerator cathode-ray tube requires less beam current than the mono-accelerator and deflects this beam at lower velocity. Acceleration of the already deflected beam is then accomplished through the use of an exterior anode connection. The mono-accelerator makes possible less distortion for the same light output.

Q. Why does the cathode-ray tube require a mu-metal shield?

A. When very strong a-c fields are in the immediate vicinity of the cathode-ray tube, a mu-metal shield is necessary to resist resulting magnetic fields. The shield is hydrogen annealed to fix the magnetic shield properties and to insure maximum effectiveness. The annealing consists principally of baking the shield in an oven at approximately 1100° centigrade for four hours, followed by slow cooling to room temperature. Any metal that has not received the annealing process is not recommended as shield material for a cathode-ray tube. They are used, however in other parts of the scope for shielding purposes where the voltage potential is not very high.

Q. What are the effects of a blue and amber filter on a scope using a P7 screen?

A. The P7 is a dual purpose screen having a short-persistence fluorescence and a long-persistence phosphorescence. The blue filter when applied to the P7 screen attenuates the long-persistence phosphorescence and transmits a short-persistence blue light. The amber filter absorbs the blue light and emits the long-persistence yellow light to the observer.

Developments In Photographing Scope Traces

The need for photo-recording of oscillographic traces arose almost as soon as the first oscilloscopes became available. As early as 1937, the "Oscillographer" (venerable predecessor to the "Du Mont Instrument Journal") ran an article on photo-recording, and since that time, has devoted considerable space to the subject.

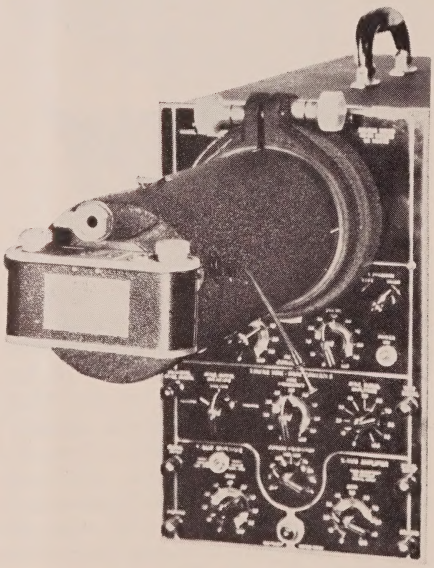
Early requirements were not particularly stringent and as long as simple, low-frequency, repetitive patterns were involved, the makeshift equipment of the day turned out recordings that occasionally were almost usable.

Need For Recording Equipment

As applications for the oscilloscope broadened, and signals of increasing complexity were encountered, the need for specialized photographic equipment became acute. Thus, very shortly after the close of World War II, Du Mont produced the Type 271-A Oscillograph-record Camera which promptly became "Standard Equipment."

Since that time, the Du Mont line of photo-recording equipment has been steadily augmented to meet the increasing needs of the industry.

When you consider that there are frequent occasions in single-transient studies when the exposure time runs as short as 1/10,000,000 sec, (and this, at very low light level), it becomes apparent that conventional photographic equipment simply cannot be expected to provide satisfactory results.



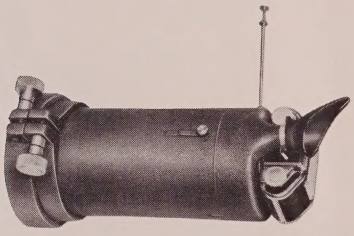
The Du Mont Type 271-A Oscilloscope-record Camera shown attached to the Du Mont Type 208-B Oscilloscope.

Taking into consideration the various ranges of applications of photo-recording, Du Mont has produced a complete line of equipment, which is reviewed here.

Type 296

The Type 296 which is a low cost, easily operated camera that is designed for general purpose recording of repetitive phenomena as well as low and medium-speed transients. It features an f/2.8 coated Wollensak Raptar lens, enabling the photographing writing rates in excess of 20 inches per microsecond from a P11 screen.

The barrel extension design and light weight enables the 296 to become easily adaptable to the Du Mont Type 2501 (5-inch) Bezel or equivalent. The 296 requires no additional support. 35 mm film is used in standard 20 or 36-exposure cassettes. The Type 296 is an economical, dependable, and durable camera designed for general-purpose recording.



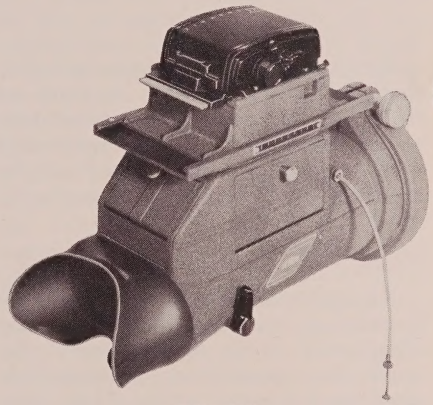
TYPE 296

Types 299 and 302

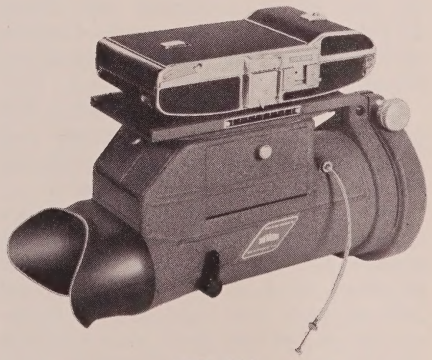
The Types 299 and 302 cameras feature identical mechanical design. A device development by Du Mont known as the "sliding back adapter" enables the user to convert from the Type 299 to the Type 302 very easily. The 299 uses the Graflex roll-film camera while the 302 uses the convenient Polaroid-Land picture-in-a-minute camera. The similarity of the two cameras include the housing, a beam-splitter mirror, lens and shutter assembly.

Both cameras are designed for single frame recording of stationary or single transient patterns. With the use of the sliding back adapter an arrangement is provided to enable the user to record written data (by means of double exposure) directly on the print. During recording, the waveforms or data card may be observed through a dichroic beam-splitter without danger of ambient light fogging the film or interfering with the recording. As is the case with the Type 296, both the 299 and 302 have a clamp ring for mounting the camera directly to the bezel, thus eliminating the need for additional support.

The Types 299 and 302 offer durable, lightweight and highly versatile single-frame recording from 5-inch cathode-ray oscilloscope screens.



TYPE 299

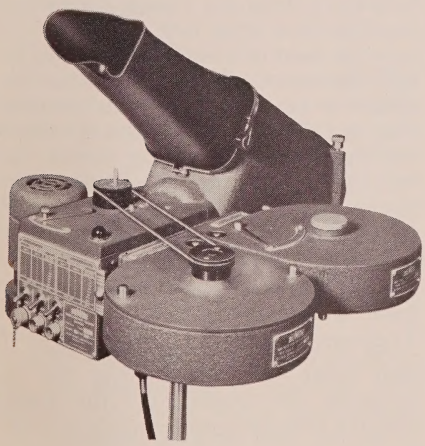


TYPE 302

Type 321-A

When the need arose to record changing waveforms over a period of time, single frame recording cameras were not sufficient to give complete pictures of the phenomena. To meet this problem, Du Mont designed a camera specifically for continuous motion recording; the Type 321-A. The 321-A will record up to 400 feet of film, and is also capable of single frame recording over the entire gamut of general laboratory uses. A take-up and supply magazine holds the film, and features a cutting blade that automatically snips the film off at any desired location when the take-up magazine is removed. It also features a controlled selective-speed film drive mechanism with an electrical brake that stops the film with less than six inches of coasting —even at high speeds. Other features are a timing marker, illuminated data card, and an adjustable floor stand. Either perforated or unperforated film may be used.

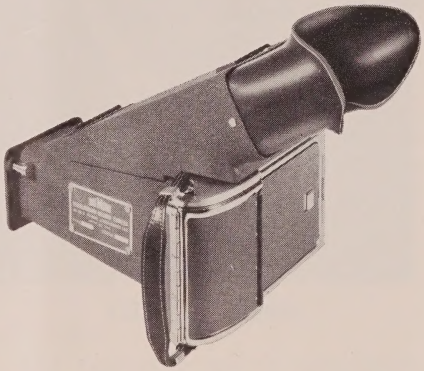
With the use of the Type 321-A, continuous-motion recording or single-frame recording may be accomplished with the same camera. The 321-A, with its adjustable floor stand, is adjustable over 90° so that the camera can be placed in an appropriate position for applications requiring vertical film travel. The Type 321-A features a f/1.5 50 mm coated lens.



TYPE 321-A

Type 339

The Type 339 is designed for 3-inch oscilloscopes. It is intended for single-frame recordings using the Polaroid-Land process. It is self-supporting on the Du Mont type rectangular bezel, and can be connected and disconnected to the bezel very easily. Although specifically designed for the rectangular bezel, it is readily adaptable to any 3 inch oscilloscope by means of an adapter kit. The 339 features the Wollensak f/2.8, 50 mm coated lens and Alphaz shutter — usually found only in the higher priced cameras.



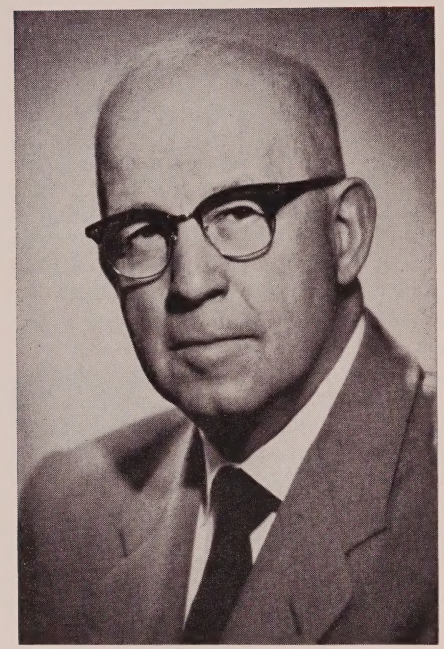
TYPE 339

Type 352

To further enhance the effectiveness of oscilloscope photo-recording, Du Mont developed the Type 352. The Type 352 makes use of the same mirror housing as the earlier 299 and 302 models, but an important added feature is the use of the "Robot Recorder". The "Robot" is fitted with a spring wound automatic film advance capable of transporting film at the rate of up to 6 pictures per second. To extend the number of pictures that can be taken, an accessory Type 2633 Spring Booster motor is available. Remote operation of the

(*Continued on page 14*)

Who and Why



FRANKLIN Y. GATES

Franklin Y. Gates has been a Sales Representative for Du Mont longer than almost anybody. It is with great pleasure and respect that we tell you about him. His territory for Du Mont Technical Products is: Southern Idaho, Wyoming, Utah, Colorado and New Mexico.

Franklin Y. Gates, better known as Frank, does business as the Gates Company with headquarters at 200 South Main Street, Salt Lake City, Utah, and with a branch office at 4910 South Huron, Englewood, Colorado, and one at 122 Harvard Drive, S. E., Albuquerque, New Mexico. Frank Gates' entrance into the manufacturer's representative field started in 1943 with his base of operation, The Rocky Mountain Area.

To go back a lot farther, Franklin Y. Gates was born in Provo, Utah, a small town about 40 miles south of Salt Lake City. His parentage runs back to the sturdy Mormon pioneers who crossed the plains and settled in Utah. Yes, the middle initial is for 'Young'. When he is out of Utah he is invariably asked, "Are you related to Brigham Young?" He is—Frank's mother was a daughter of Brigham Young, and of course a lot of other questions follow. (*Editor's Note: Answers to these questions weren't supplied to us.*)

Frank's schooling was interrupted by his early marriage when barely out of high school, and a voluntary mission to the Hawaiian Islands for the Mormon Church. Later he returned to school, graduating from the University of Utah with a B.S. degree in physics, followed by a year's post graduate work at Harvard.

Shortly after his return from the east he became a member of the faculty of Brigham Young University, leaving there after four years to enter into the field of electronics and acoustics. He served as assistant chief engineer of the Federal Radio Commission in 1928-29; that period of intense activity in radio during which the frequency allocation policies were formulated. In 1930 and '31 he went to Hollywood, and was in charge of acoustical research work for Vitaphone during the transition from silent movies to talkies.

In 1933, Frank was again back in Salt Lake City weathering the depression. He worked for the Radio Service Corporation, owners of KSL,

(*Continued on page* 14)

Stability In High-Gain, D-C Amplifiers

D-c sensitivity in the microvolt range has long been sought in oscilloscopes, but has been impractical until recently because of stability problems. A review of the steps taken to achieve this stability — thus practical microvolt sensitivity — in the new Du Mont Type 403 is presented.

Sensitivity, ac or dc, of the new Du Mont Type 403 Scope is specified at 1 millivolt full-scale, with effective resolution down to better than *20 microvolts.* In practical terms, this means that the 403 may be used directly with such low-output transducers as strain gages, pressure pickups, accelerometers, etc. without the usual preamplification.

The ability of this instrument to provide accurate d-c measurements of levels down to 20 microvolts results from an integrated attack on the stability problem, with attention on various segments of the amplifier circuitry and of the voltage supply sources.

Vertical Deflection Amplifier, Circuit Considerations

The vertical deflection amplifier features an overall gain of 100,000. As in any high-gain amplifying system, the most important part is the input stage. The input stage of the Type 403 consists of a pair of cascode tubes arranged in a balanced cascode configuration (See Figure 1). The advantages of this arrangement, and the use of Type 6J6, are: (1) Minimum differences in change of transconductance of both halves of the tube due to heater-potential variations, (2) high input impedance, (3) low gas currents, (4) two extra grids are available to facilitate d-c balancing of the input stages, and (5) achieves the high gain of pentodes with the low noise of triodes.

An important feature of the 6J6 in this application is the fact that it uses a single heater element within a single cathode, serving as a common emitter for both halves. As a result, changes in heater voltage tend to produce smaller differential changes in emission than would be the case with separate heaters and cathodes.

Closely Controlled Supply Voltages

The heaters of the vertical input cascode and interstage amplifiers, which includes that of the sensitive 6J6 mentioned, are regulated dc to minimize any changes in the heater voltage. This is accomplished by a full-wave bridge rectifier, the output of which is coupled to 0.9 ampere and 0.45 ampere series heater regulators.

The demand made on the input stage for extreme stability is high. In order to limit the drift of the amplifier adequately, it was necessary to hold drifts of plate load current to less than 0.45 uamps, this means controlling current to within 0.05%.

A prime factor in achieving this close control is the use of a large negative supply voltage for the cath-

ode returns of the input stages. Thus the value of the common cathode-resistor in this amplifier input stage can be increased considerably. Among other advantages, this system enables better balance, thus stability.

Acute Balance Control

For optimum operation of a balanced amplifier, it is desirable to have perfect balance between the operational characteristics of both halves of the amplifier (see Figure 1). In other words, to prevent an unbalance, and poor common mode rejection, it is necessary that both halves of the cascode tubes operate at approximately the same value of plate current, grid voltage and transconductance. To accomplish this, the 403 has been provided with two types of balancing circuitry—static and dynamic.

Static balance is gained by varying plate-dropping resistances to the power supply. In the Type 403 this resistance is varied by the Y MULT BAL control. To obtain a more perfect balance, this instrument has incorporated a second control over the plate voltage—which provides dynamic balance. The name of the control that accomplishes this feat is, as a matter of fact, the DYNAMIC BAL control. The DYNAMIC BAL control varies the amount of current shunted from each plate of the input amplifier to the negative supply. The resistance of this circuit is too large to affect the load resistance, thus the operating point is changed while the load remains constant. The proper combination of adjustment with these two balance controls maintains balance over a large range of balanced and common mode signal levels, giving optimum stability and common mode rejection.

More To Come

Sensitivity requirements in oscilloscopes are becoming more stringent each year. Now that Du Mont has broken the stability barrier necessary to meet new sensitivity requirements, further developments will rapidly extend this important aspect of instrumentation.

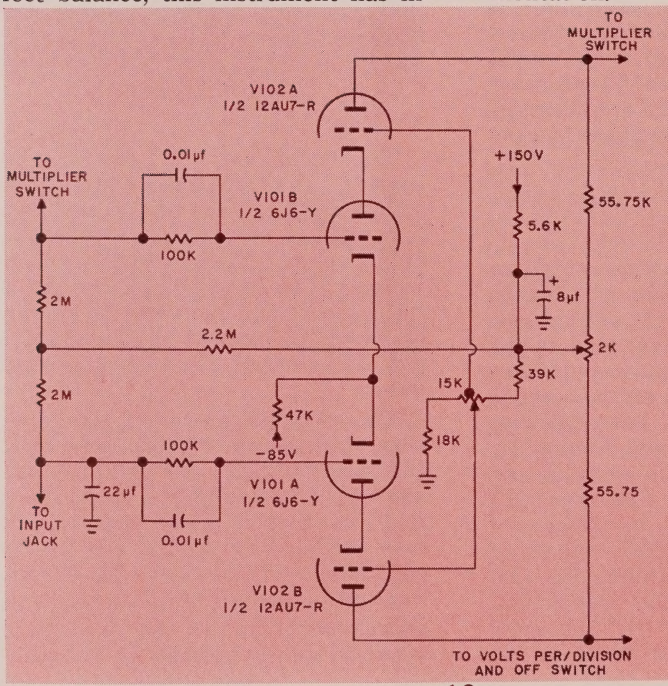
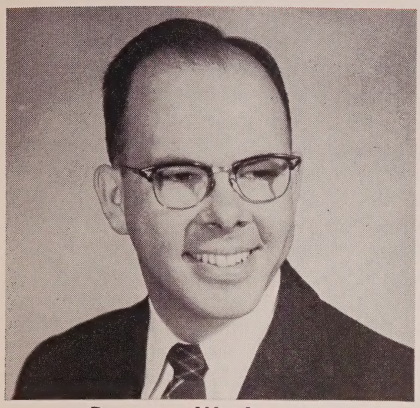


Figure 1. Schematic of input cascode section of vertical deflection amplifier used in the Type 403.

Sales Announces Two New Appointments



Brewster W. Jameson

Appointment of Brewster W. "Bo" Jameson as assistant manager of instrument sales was announced recently by Morton G. Scheraga, instrument sales manager. "Bo's" duties will consist of assuming all responsibilities of the sales manager in his absence; to assist the sales manager in the establishment of general sales policies; assist in the selection, supervision and control of "independent" sales representatives; and to work closely with the manager of technical advertising in preparation of technical sales literature.

A graduate of Harvard University, with a B.S. degree in Physics, "Bo" upon graduation served as sales engineer for Consolidated Edison of New York until he was recalled to active duty in the United States Navy during the Korean conflict. He served aboard a destroyer as an electronic specialist and later as electronic officer with the Atlantic Reserve Fleet.

Prior to his appointment of assistant sales manager, "Bo" was sales manager of Du Mont's New England sales office in Newton, Massachusetts. Because of his knowledge of the electronic instrument market, his familiarity with the problems of customers and sales staff in the field, the selection of "Bo" for this position was an easy task.

Gilbert M. Davidson

A recent addition to the Du Mont Technical Sales Department is Gilbert M. Davidson, Market Research Engineer. Gil relieves Bob MacAuley (one of our home office sales engineers) of this duty so that Bob can devote full time to selling Du Mont instruments. Gil's job will be to forecast future sales and to conduct a market analysis to aid in the future development of electronic test equipment.

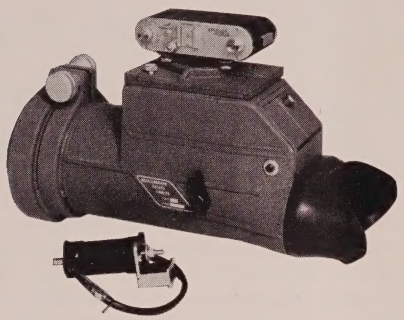
After earning a degree in electrical engineering from Cornell University, the desire for further schooling took Gil to California and Stanford University where he received a masters degree in Business Administration.

With his education completed Gil began his career in industry with Curtiss Wright working as production models engineer. He later became liaison engineer on gyroscopes and navigation systems for the Kearfott Company, Inc. While serving with the U. S. Army from 1954 to 1956 Gil worked in the Human Engineering Laboratory at the Aberdeen Proving Grounds, Aberdeen, Maryland doing field research on missile systems. Prior to his newly appointed position with Du Mont, Gil served as customer relations engineer on airborne analog computer and test-equipment for the Avion Division of A.C.F.

Developments In Photographing Scope Traces

(*Continued from page 9*)

camera is made possible by means of an accessory electrically-operated Type 2634 Solenoid.



TYPE 352

Continuing Development

Progress in simplifying photo-recording is a regular assignment at Du Mont. What the company hopes to achieve in the future is to eliminate the need for a dark room and dark room facilities in the developing of oscilloscope record film. The majority of camera users do not want to be bothered with all the intricacies of film development, but would much rather have the recorded results show immediately. The only type of film that can presently accomplish this feat is, of course, the Polaroid Land Camera—whose performance is limited for high writing rates.

There is a desire to develop even faster lenses to record much higher writing rates, to minimize the handling of film in order to hasten the results of recording phenomena, and to consistently design cameras that will feature easy handling and simplicity of actual operation.

Who and Why

(*Continued from page 10*)

doing commercial and technical work. After the depression eased, Frank went into business for himself doing consulting work, largely in the field of acoustics for broadcast stations and architects. The results of some of the work he did during this period found its way into a number of national publications, and was finally picked up by *Time* magazine of March 26, 1945. It was in 1943 that he took the opportunity to enter the electronic representative business.

The early days were rugged, traveling great distances, sleeping in the car at night and living on hamburgers to save enough money to take a prospect or customer to dinner. It was two years before he broke even. Had it not been for the challenge he had accepted, his love of the West, of science, and people, he would have probably called it a day. It is probably because of these experiences he was sympathetic and able to help several others get started in the representative business.

There are lots of human interest stories he could tell, such as his first visit and trip to New Mexico prompted by an inquiry from Sandia Corporation and forwarded to him by Du Mont. About how he came close to being machine gunned there, how he was worked over by the security official and finally was successful in making the first visit those cloistered Sandia engineers had had from any outside factory representative.

According to Frank, "Because of the pleasure and joy in my work and the gradual growth of my business, I doubt if anyone can match me in the satisfaction I have had over the years."

Our next "Who and Why" subject will be J. R. Dannemiller, whose territory of Ohio and Michigan also entails peculiar challenges.

EDITOR'S PAGE

This page is, in our mind, slightly mis-named. We would rather think of the Editor's Page as a Readers' Page. Your comments, suggestions, complaints, compliments, etc. are graciously accepted, and when feasible are printed here for our other readers to enjoy. Let's hear from **you.**

Letters to the Editor

Dear Sir:

"On page No. 6 of Volume 16, No. 1 of the 'Oscillographer', you have a figure No. 5 in which you state as follows:

'In (b), one gage is positioned so that it will not be stressed and is used for temperature compensation when measurements are taken over a period of time.'

I wish to point out that if gage B is cemented to a material in the manner shown, there will be an appreciable change in output due to Poissons ratio."

John A. Kell
Asst. Research Engr.
The Chesapeake and Ohio Railway Company

Ed's. Note: Error will be introduced due to Poissons ratio, the amount of error depending on application, type of strain gage, etc. For the application discussed in the article, the stress on gage B, thus the error introduced, is negligible in relation to the compensation gained for error due to temperature change.

Dear Sir:

We have just received the new issue of your Du Mont Instrument Journal, replacing the old Oscillographer, and are very impressed with this publication . . . We look forward to receiving the next issue of this journal.

Geo. H. Sample & Son Pty. Ltd.
Melbourne, C. I., Australia

Dear Sir:

"I have just read issue I of the Du Mont Instrument Journal. It was very interesting and I did enjoy reading it from cover to cover. However, I feel that I must make reference to a sentence in the Editor's Page, page 19 — 'We will enjoy hearing any comments you may have appropo to the electronics industry'.

Although my comment may not come within the scope of that sentence, I feel that it is *apropos.* Yes, you did misspell the word. Please check Webster's or other good dictionary. (Or was it done intentionally to get a response)."

Kelso Jones
Capt., USAF

Ed's. Note: It was an honest-to-gosh goof, Several other people noted this mistake too. It is very complimentary to know that we have such diorthotic readers. Thanks Captain, and others, your comments were certainly apropos.

EIGHT BALL CORNER

Correction

In the last issue of the Oscillographer (predecessor of the Du Mont Instrument Journal), Vol. 16, No. 1, the feature article "Strain Gage Control — A Boon to Oscillography" included a formula that was made entirely inaccurate by the mere flip of a typography layout. On page 6, in the middle of the page, a formula for gage factor reads $K = \frac{Rg\triangle S}{\triangle Rg}$. It should be reflipped to read $K = \frac{\triangle Rg}{Rg\triangle S}$. Sorry.

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